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I do not pretend to estimate the number of the "initiated" into this recognition. I do know that there are those who are uninitiated and half initiated—among the public, in biology, and in our own ranks of historians and anthropologists; which fact is a reproach and a cloud on the so-called enlightenment of our day. If there is nothing beyond the organic, let us quit our false and vain business and turn biologists, and encourage the world to reason and interpret only in organic terms. But if there is a superorganic phase, it behooves us not merely to rest supine within our knowledge, but to press this great truth at every opening and every turn, to brand each error and confusion as fast as it raises its head, to stigmatize all half-hearted evasion, to meet argument with argument and, if necessary, assumption and assertion with counter assumption and assertion, to fight candor with candor so far as may be in us, reasoning with reason, presumption with a challenge; to stir stupidity unceasingly, harrass cowardice without mercy, and encounter prejudice with every weapon and on every condition of its own choosing; until the time shall come when there will no longer be question of the proportion of the initiated, but a true democracy of the intellect shall prevail in which there are no more uninitiated or outcast, in these matters at least; when we shall be able to push on to the next of the problems that lie before us in infinite series.

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REMARKS ON THE AZTEC CALENDAR SYSTEM

Dr. Waterman, in his recent paper, "The Delineation of the Day-Signs in the Aztec Manuscripts,"[1] has presented a comprehensible and concise interpretation and exposition of the workings of the calendar system of the Aztec. It is by no means my intent to review or to criticize this presentation, but rather to amend it by voicing some ideas which presented themselves during its perusal.

The Aztec *cempoalli*, as Dr. Waterman remarks (p. 302), has been generally interpreted as a month, though having absolutely no relation, as has the modern month, to the phases of the moon. It is easy to see how this interpretation has arisen, the *cempoalli* consisting of twenty days and thus approaching, more closely than any other Aztec temporal division, the length of the lunar month. If, however, we analyze the Aztec calendric elements from the point of view of their progressions, rather than of their respective lengths, a different interpretation immediately presents itself. Dr. Waterman, though explaining that the *cempoalli* should not be interpreted as a month, yet commits the error of analogizing it with the Roman month in his later discussions (p. 309). Thus he states that the Aztec dated their days in sequence in a manner which would correspond to our progression *January one, February two, March three*, etc., concluding that this system is "utterly different from what we happen to do ourselves" and "the last thing probably to suggest itself if one of us were inventing a calendar system." Such an interpretation is calculated rather to make the average student despair of ever comprehending the vagaries of the Aztec calendar. As a matter of fact, if properly interpreted, the system is strikingly like the European.

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[1] *University of California Publications in American Archaeology and Ethnology*, xi, 6.

In both the Gregorian and the Aztec calendars two main categories of time are, or were recognized; one composed of a definite number of *named days*, the other of a definite sequence of *numbered dates*, *i. e.*, the *week* and the *month* respectively. The *cempoalli* is consequently the Aztec week, not the month. This interpretation was recognized by Seler in "The Tonalamatl of the Aubin Collection" (p. 6), though not on the above grounds. The fact that the "week" thus consisted of twenty days and was the more important factor in dating, while the "month" consisted of only thirteen days and was entirely disregarded, need not disturb us. The Aztec thus dated his days in sequence *Monday* first, *Tuesday* second, *Wednesday* third, just as we. When he reached Cane, the thirteenth, he began the dates over again with Ocelot the first, just as naturally as we follow Wednesday the thirty-first with Thursday the first. Neither did he feel constrained to commence his dates over again anew after he had run through his twenty days, any more than we feel compelled to follow Saturday the seventh with Sunday the first. In both systems there are two continuous and simultaneous, though independent, progressions.

The crux of the difference between the Aztec and the Gregorian calendars is that the Aztec used only the day and the date, as Water the eleventh, while we interpolate also the name of the month, as Friday, *March* the eleventh. Moreover, we disregard the name of the day for purposes of dating. But let us suppose that we did not use the names of the months for purposes of dating but used the day names instead; the two systems would then be perfectly analogous. Thus the Aztec used twenty days and thirteen dates in all possible combinations, a total of 20 times 13 or 260 indices, while we use seven days and thirty (more or less) dates, a total of 7 times 30 or 210 indices. Thus in the solar year, a duplication of 105 indices occurred in the Aztec calendar, while in ours a duplication of 155 indices would occur if all our months were of regular length. Thus in this year (1916) many of the indices will occur only once. Sunday the first can occur only in October, Tuesday the sixteenth only in May, Thursday the twenty-ninth only in June. But Monday the fourth may be a given day in either September or December, Wednesday the fifteenth in March or November, Saturday the nineteenth in February or August. Due to the irregularity in the lengths of our months, some indices occur three times in our calendar year, as in the months of January, April, and July of this year. This would not be so if, as in the Aztec calendar, all months had the same length. It will be readily seen that such a system has great disadvantages in a modern civilization, but was a perfectly satisfactory scheme in a society where the principal purpose of the calendar was to distinguish lucky from unlucky days, such as the determination of our unluckiest of all days, Friday the thirteenth, which will fall in October this year.

Had the tendency to consider the Aztec system as an academic philosophical problem rather than a practical working system for the distinction of dates been properly avoided, such naive explanations for the limitation of the Aztec month to thirteen days as those which Dr. Waterman has compiled and criticized might not have been perpetrated. Dr. Waterman falls into the same error in stating (p. 323) that, since there were twenty day symbols, determined by the vigesimal numeral system of the Aztec, "we should certainly expect it to lead to the selection of twenty calendar numerals." A moment's thought will show one that, had 20, or any factor of 20, that is, 1, 2, 4, 5, or 10 been used for the number of days in the smaller temporal division, every *cempoalli* would begin with the numeral 1 and no distinction could have been made between them without further appending the name of the *cempoalli* as a whole.

It was obviously a desideratum, if not an absolute essential, that such a number be used in combination with the twenty day-signs that the entire number of possible combinations of day-sign and number (index) be exhausted within the solar year with as little duplication as possible. It has been shown that no factor of 20 would accomplish this result. Similarly, if the number 8 were used, every other of the eighteen *cempoallis* in the solar year would be alike; if 3, 6, 12, or 15, every third; if 16, every fourth. If 7 or 14 were used, every seventh *cempoalli* would be alike, every index occurring at least twice in the solar year, the majority three times. If 9 or 18 were used, every possible index would occur twice yearly. There remain as possible integers 11, 13, 17, and 19, each of them exhausting a large number of indices and leaving as a residue a varying number of indices which must be repeated in any given solar year.

Here the calendrists were brought face to face with a dilemma. They must choose between a numeral such as 11, which left a large number (145) of duplicate indices in the year, and a numeral such as 17 which, though permitting but few duplicate indices during the year (25), yet, because of its high numerical value, must have involved considerable difficulty in writing and reading. For it must be borne in mind that no system of numerical orthography had been evolved for the writing of dates, and that to write the number 17 required drawing laboriously seventeen circles. Is it too much to suggest that the number 13 was adopted as a mean between the equivocal 11 and the laborious 17?

Again, let us suppose that Aztec custom required or preferred that the year begin and end with the same date, as it actually did. The only one of the three numbers is 13, indeed the only one of the higher numbers besides 7 and 14 which will secure this end. This may well have been a causative factor rather than a secondary result, as already suggested by Dr. Waterman (p. 313). It is interesting to note that our calendar attains the same result by the use of one of the above-named alternate integers, namely 7, so that our year normally begins and ends on the same day of the week.

This seems to me to be a more rational explanation for the existence of the element thirteen in the Aztec *tonalamatl*, not that it is derived from intricate astronomical observations, nor from religious custom, nor yet from the addition of ears and noses, but merely that it is the number which most satisfactorily fulfills the requirements for the practical purpose to which it was put, the distinction of dates. Nor is it necessary to assume that some Aztec Gregory figured it out as we have done; in the course of time, through natural observation and correction, the exact combination most satisfactory to the case must eventually have been evolved.

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DR. SPECK'S "THE FAMILY HUNTING BAND"[1]

I SHOULD like to discuss a few points raised by Dr. F. G. Speck's paper in a recent number of the *Anthropologist*, called "The Family Hunting Band as the Basis of Algonkin Social Organization." In dealing with

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[1] The *American Anthropologist*, Vol. 17, pp. 289–305.